# A NEW SPECIES AND NEW RECORDS OF SYMPHYLA (ARTHROPODA: MYRIAPODA) FROM DELAWARE[1]

Robert T. Allen, D. A. Walther [2]

ABSTRACT: Four genera and species of Symphyla were identified among over 300 specimens collected from Berlese samples from the Middle Run Valley Natural Area near Newark, Delaware. *Symphylella delawarensis* was recognized as a new species, providing the first published record of this genus east of the Mississippi River.

During a recent survey of the arthropod fauna of the Middle Run Valley Natural Area near Newark, Delaware (New Castle County), over 300 specimens of Symphyla were collected from forest litter and moss samples. We have identified four different genera and species from these collections.

The very distinct *Scolopendrellopsis subnuda* (Hansen) (Figs. 1-4) has been identified from the Delaware material. This species, originally described from Italy (Hansen, 1903), has additional records from Europe and Michigan (Loring, 1980). A second genus found was *Hanseniella*. All specimens were immature and not identifiable to species. Previously, the genus *Hanseniella* was recorded in North America from California (Hilton, 1931; Michelbacher, 1939b) and Arkansas (Allen, 1992). Only one immature specimen of the genus *Scutigerella* has been collected. This specimen was hand collected under a stone near a small stream that flows through the area. By far the most abundant taxon in the samples, 242 specimens, appears to be a new species belonging to the genus *Symphylella*.

Edwards (1990) listed 11 species of *Symphylella* from North America. Nine of these species are known only from California (Michelbacher 1939a, 1939b, 1941, 1942). *Symphylella vulgaris* (Hansen) has a worldwide distribution and has been recorded in North America from California and Michigan. *Symphylella isabellae* (Grassi) is wide spread in Europe and has been reported by Hilton (1931) from southern California and from the Baja peninsula of Mexico. Since the work of Michelbacher (1942) no new species of *Symphylella* have been described from North America, although Scheller and Muchmore (1989) recently described *S. caribica* from St. John in the U. S. Virgin Islands.

[1] Received February 8, 1993. Accepted May 3, 1993

[2] Department of Entomology and Applied Ecology, College of Agricultural Sciences, University of Delaware, Newark, DE 19717-1301

## *Symphylella delawarensis* New Species

Description. Head (Figs. 5-6). 1.2 times wider than long, widest at spiracles or just behind; central rod distinct, interrupted medially, anterior lines extending laterally to near insertion of antennae, lines also extending laterally from the mid-point interruption of the central rod and then diagonally to near insertion of antennae. Tergal surface of head (Fig. 5) with mostly short setae, approximately 1/2 length of the long setae near base of antennal insertion.

Postantennal organ with outer circumference weakly defined, opening distinct, outer circumference approximately 2.6 times larger than opening. Palp of first maxillae straight, conical, pointed. Ventral surface (Fig. 6) with three distinct groups of setae; a lateral group each side composed of two parallel rows of setae; a median group (on mentum) composed, anteriorly, of two rows of setae each side of the midline that merge posteriorly and continue posteriorly to the head midline.

Antennae (Figs. 8-9). Antennae with 17-18 segments, left one with 18. Segment I and II subequal in size. Numbers of setae in apical and secondary whorls (left antenna of holotype) as follows:

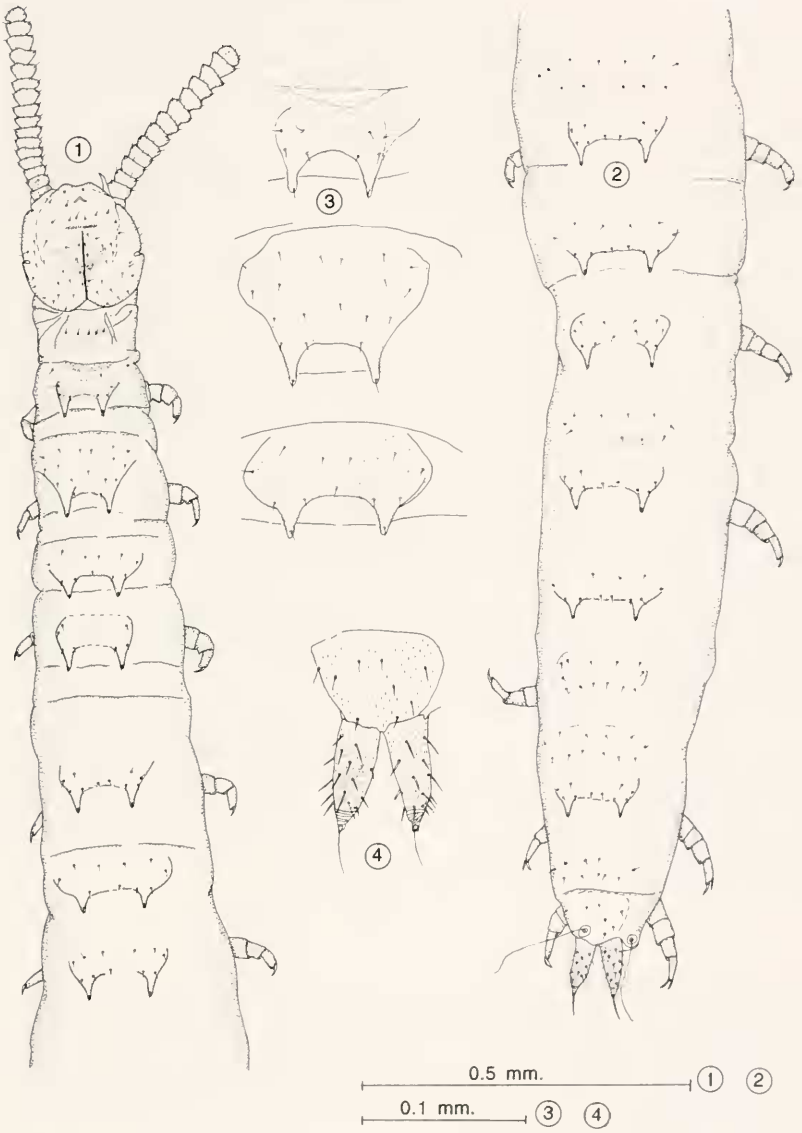
| seg | I | II | III | IV | V | VI | VII | VIII | IX | X | XI | XII | XIII | XIV | XV | XVI | XVII |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| api | 2 | 7 | 8 | 9 | 10 | 10 | 10 | 10 | 9 | 11 | 11 | 12 | 12 | 11 | 9 | 10 | 9 |
| sec | | | | | | | 2 | 3 | 2 | 2 | 3 | 2 | 2 | 5 | 4 | 4 | 4 |

Segment II with 2 setae; segments II-V with 7-10 setae in apical whorl; segment VI-XVIII with 9-12 setae in apical whorl, secondary whorl (usually) beginning on segment VI, only visible ventrally with 2-5 setae on all segments; round, clear sense organ on segments V to penultimate segment; the number of bladder-shaped organs (of Scheller) on the different segments variable, holotype as follows: X2, XI-3, XII-2, XIII-2, XIV-3, XV-7, XVI-7. Segment II, 1.6 times wider than long, lateral inside protruding seta 0.43 width of segment II, lateral outside protruding seta 0.28 width of segment II; III, 2.0 times wider than long, lateral inside protruding seta 0.38 width of segments III, lateral outside protruding seta 0.21 width of segments III; X, 2.0 times wider than long, apical whorl seta, 0.18 width; apical segment oval.

Tergites (Figs. 7, 10-11). I rudimentary with 3-4 setae each side. Thirteen tergites with triangular processes, tergites 2-14. Number of setae on outside lateral margin, inside margin of triangle process and posterior margin between apical processes given in Table 1.

Table 1. Number of setae on the margins of the dorsal tergites

| Tergite No. | Outside lateral Margin | | Inside Margin | | Post.Marg. |
|---|---|---|---|---|---|
| | left | right | left | right | |
| 1 | 3-4 | 3-4 | – | – | – |
| 2 | 5-7 | 5-6 | 3-4 | 2-4 | 2 |
| 3 | 8-11 | 8-10 | 3-4 | 3-4 | 2-4 |
| 4 | 5-7 | 5-8 | 2-4 | 3-4 | 4-6 |
| 5 | 6-9 | 7-10 | 3-4 | 3-4 | 2-5 |
| 6 | 10-13 | 10-12 | 3-4 | 3-4 | 4-7 |
| 7 | 5-8 | 5-8 | 3 | 2-3 | 6-8 |
| 8 | 8-9 | 7-9 | 3-4 | 3-4 | 4-6 |
| 9 | 9-11 | 9-11 | 3-4 | 3-4 | 4-7 |
| 10 | 5-7 | 4-7 | 2-3 | 2-3 | 5-8 |
| 11 | 6-8 | 6-9 | 3-4 | 2-4 | 5-7 |
| 12 | 8-11 | 8-11 | 3-4 | 2-4 | 4-6 |
| 13 | 5-6 | 4-7 | 2-3 | 2-3 | 5-7 |
| 14 | – | – | – | – | 16-20 |
| 15 | 6-7 | 6-8 | 2-3 | 2-3 | 2-5 |




Figures 1-4. *Scolopendrellopsis subnuda*. (1) Habitus, head, antennae, leg segments 1-6; (2) habitus, leg segments 7-12, apex of abdomen.

**Ratio** of distance between processes to their length, 0.6, 0.5 and 0.3 on tergites 2, 3 and 4 respectively; triangular processes without circular end-swellings or knobs; extreme apex of processes sometimes slightly lighter in color. Tergites 3, 6, 9 and 12 longer than preceding ones. Basal outside marginal setae long on segments 2, 3, 4, 6 and 7. Cuticle of tergite granulate, granules forming semicircular or circular spots; cuticle surrounding tergites with distinct granulate circles. Ventral surface (Figs. 12-13) with a reduced number of very short setae.

**Legs.** First pair of legs rudimentary lobes with 1 long and several short apical setae. Last pair of legs ( Fig. 14) .26 mm. long. Tarsus narrowed towards apex; 3.8 times as long as wide with 6 dorsal setae; 3 straight and pointing outward, 3 setae angled toward the apex, longest equal to width of tarsus; pubescence covering entire tarsus. Tibia length 1.5 X the width, with 4 distinct dorsal setae; pubescence covering entire tibia. Femur 1.2 wider than long, with 3 distinct dorsal setae; pubescence covering dorsal 1/4 of surface. Trochanter 1.2 times as long as wide with 1 distinct dorsal seta near distal margin; pubescence covering dorsal 1/5 of surface. Anterior claw two times as long as posterior claw.

**Styli** (Figs. 12-13). Base of legs 3-12 short, densely setose with 1 long apical seta. Coxal sacs at base of legs 3-9 with 3 setae on anterior margin of openings and 2 setae on posterior margin of opening. Coxal plates of legs 10, 11 and 12 with 5, 3 and 2 setae respectively.

**Cerci** (Fig. 15). 2.8 times longer than wide, surface equally covered with moderately long setae; pubescence covering entire surface; apex annulate, about 9 rings, with a stout apical seta.

**Immature Forms** (Figs. 16-24). A large number of immature forms of this species were collected. Of the 232 immature forms the following stages and number of specimens were represented: 7 leg pairs, 8; 8 leg pairs (Figs. 23-24), 52; 9 leg pairs (Figs. 21-22), 142; 10 leg pairs (Figs. 16-20), 30. The immatures are always smaller than the adults and with a reduced number of setae.

**Holotype.** USA, Delaware, New Castle Co., Middle Run Valley Natural Area (near Newark), 13 October 1992, D. A. Walther; (RTA-92-20-227). Deposited in the American Museum of Natural History, New York.

**Paratypes.** Eleven slide-mounted, adult specimens: USA Delaware, New Castle Co., Middle Run Valley Natural Area, D. A. Walther, from the following dates: 8 specimens, 29 September 1992; 3 specimens, 13 October 1992. 4 specimens, University of Delaware, 7 specimens, American Museum of Natural History, New York.

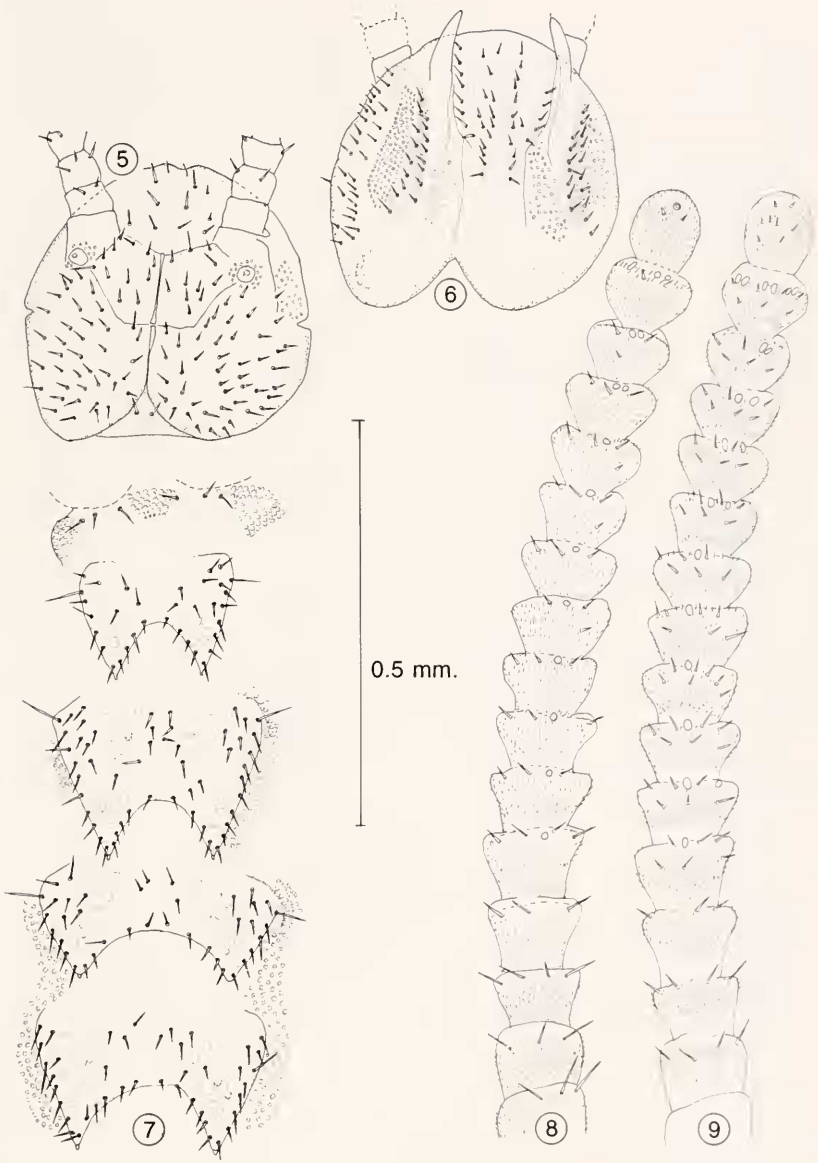
**Etymology.** The specific epithet refers to the state from which the species has been described.

**Diagnosis.** Tergites 3, 6, 9, 11 and 12 bear a larger number of setae along the outside lateral margins than *S. serriae* Michelbacher, which is very similar to this Delaware species. Distinct lateral lines emanate from the disjunct area of the central rod on the head, (a unique feature of *S. delawarensis* and *S. serriae* among the North American *Symphylella*).

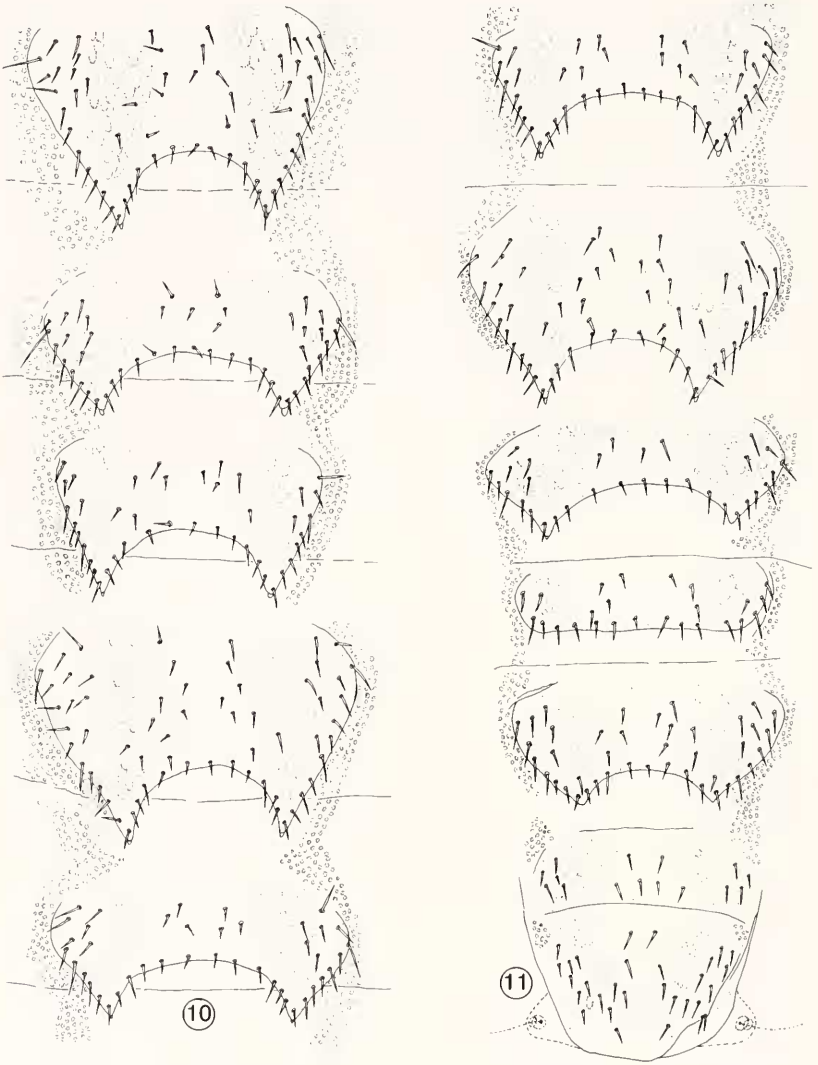
## DISCUSSION

Edwards (1990) has cautioned workers about describing new Symphyla taxa because of the addition of setae, body segments and antennal segments during successive molts. Another reason for caution is the apparent world-wide distribution of some species such as *Symphylella vulgaris* (Hansen) and *Scolopendrellopsis subnuda* (Hansen). However when a difference in one or more characters is recognized it is prudent to proceed with a description of the forms involved .

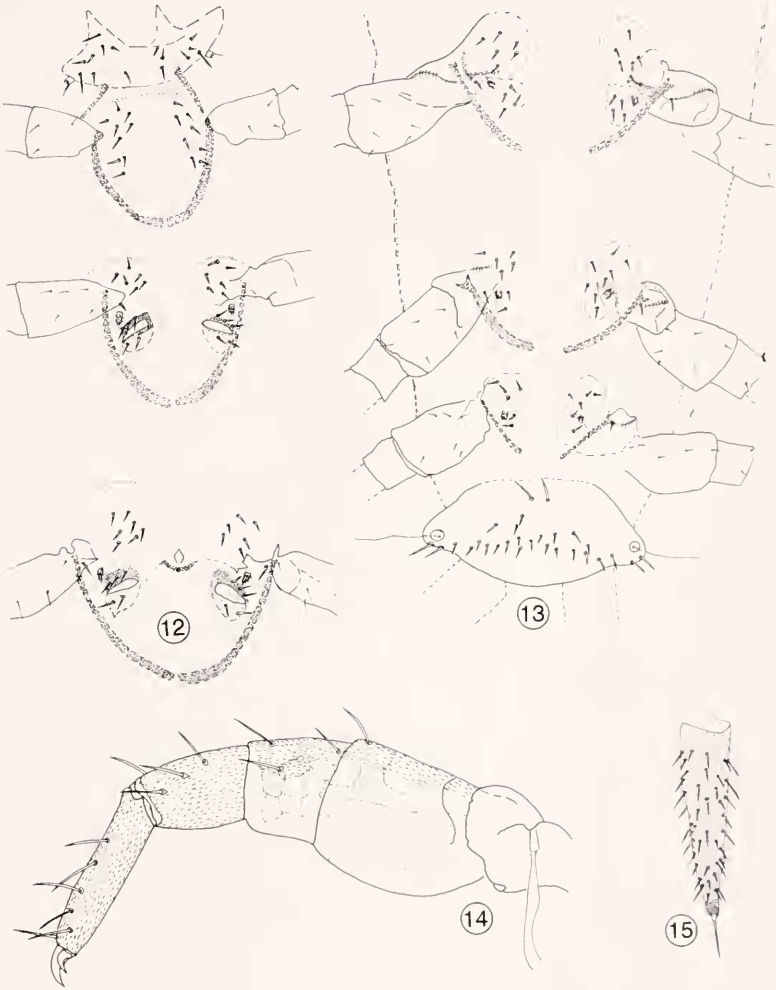
*Symphylella delawarensis* is very similar to *S. serriae* Michelbacher known from California. The most obvious character shared by both species



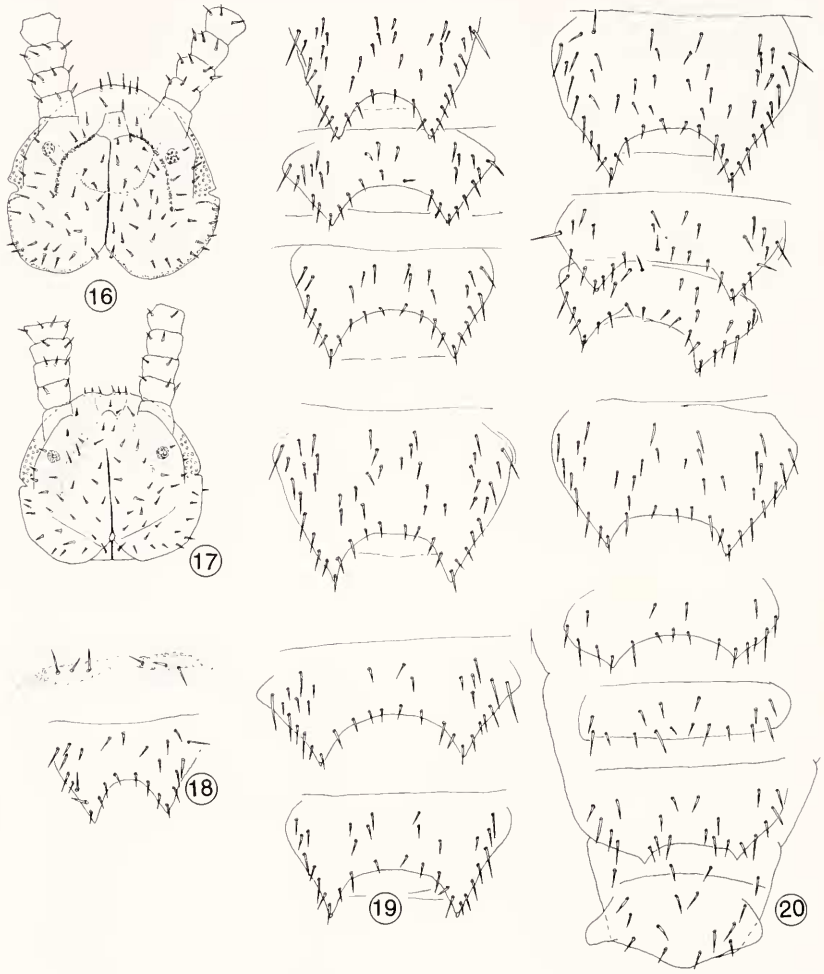

Figures 5-9. *Symphylella delawarensis*. (5) head, dorsal; (6) head, ventral; (7) tergites 1-5; (8) antenna, dorsal; (9) antenna, ventral.



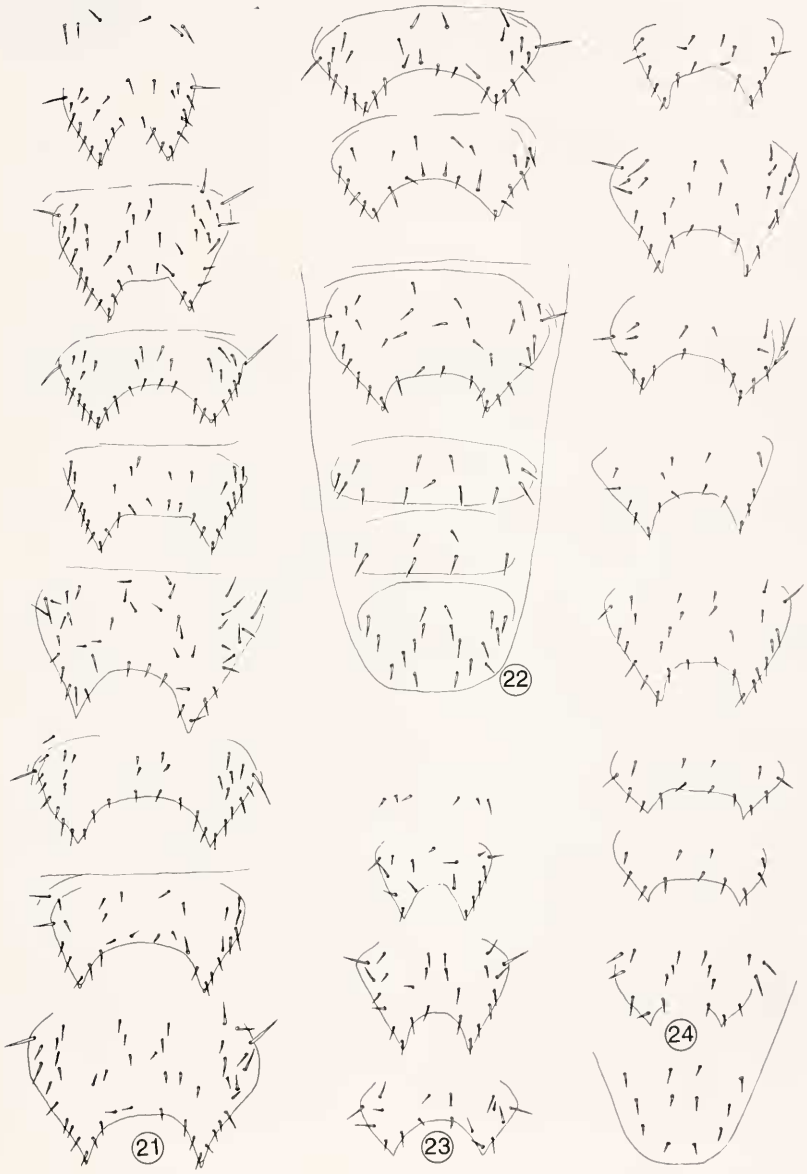

Figures 10-11. *Symphylella delawarensis*. (10) tergites 6-10; (11) tergites 11-15, apex of abdomen.




Figures 12-15. *Symphylella delawarensis*. (12) sterna, leg segments 1-4; (13) sterna, leg segments 10-12, apex of abdomen; (14) 12th leg; (15) cerci, dorsal.




Figures 16-20. *Symphylella delawarensis*. 10 leg form. (16) head, dorsal; (17) head, ventral; (18) tergites 1-2; (19) tergites 3-8; (20) tergites 9-15, apex of abdomen.




Figures 21-23. *Symphylella delawarensis*, 9 leg form. (21) tergites 1-8; (22) tergites 9-13, apex of abdomen. *S. delawarensis*, 8 leg form. (23) tergites 1-4; (24) tergites 5-12, apex of abdomen.

are the lines emanating from the area where the central rod of the head is broken. This shared feature is unique among North American Symphylella. The two species differ in the number of setae present along the outside lateral margins on tergites 3, 6, 9, 11 and 12

| Tergite No. | *serriae* | | *delawarensis* | |
|---|---|---|---|---|
| | left | right | left | right |
| 3 | 5 | 5 | 8-11 | 8-10 |
| 6 | 3 | 4 | 10-13 | 10-12 |
| 9 | 3 | 4 | 9-11 | 9-11 |
| 11 | 5 | 5 | 6-8 | 6-9 |
| 12 | 3 | 3 | 8-11 | 8-11 |

The position and number of circular organs and bladder-shaped organs on the different antennal segments also appears to be different. However these organs are too variable to use with certainty.

ACKNOWLEDGMENTS

The authors would like to thank R. G Weber, T. K. Wood and C. Tipping for reading the manuscript and offering helpful suggestions

LITERATURE CITED

**Allen, R. T.** 1992. A new species of *Hanseniella* (Symphyla: Scutigerellidae) from the Interior Highlands of Arkansas. Ent. News 103(5):169-174.

**Edwards, C. A.** 1990. Symphyla. Chapter 28. In Soil Biology Guide, ed D. L. Dindal, John Wiley & Sons, New York.

**Hansen, H. J.** 1903. The genera and species of the order Symphyla. Quart. Jour. Micros. Sci. (London) 47:1-101, Pl. 1-7.

**Hilton, W. A.** 1931. Symphyla from North America. Ann. Entomol. Soc, Am. 24:537-553.

**Loring, S J.** 1980. Extension of Range for Two Symphylid Species (Symphyla: Scolopendrellidae). Ent. News 91(1):15-18.

**Michelbacher, A. E.** 1939a. Notes on Symphyla with descriptions of three new species of *Symphylella* from California. Pan-Pac. Entomol. 15(1):21-28.

**Michelbacher, A. E.** 1939b. Further notes on Symphyla with descriptions of three new species from California. Ann. Entomol. Soc. Am. 32:747-757

**Michelbacher, A. E.** 1941. Two genera of Symphyla new to the United States, with descriptions of three new species. Ann. Entomol. Soc. Am. 34:139-150.

**Michelbacher, A. E.** 1942. Contributions toward a knowledge of the insect fauna of lower California. Proc. Cal. Acad. Sci. 24(5):153-160.

**Scheller, U. and W. B. Muchmore.** 1989. Pauropoda and Symphyla (Myriapoda) Collected on St. John, U. S. Virgin Islands. Caribb. Jour. Sci. 25(3-4):164-195.